**Table S2. Plasmids used in this study.**

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| Plasmid  | Characteristics or function | Source/ Reference |
| pEX18Tc | Broad-host-range gene replacement vector; Tcr, *oriT*+, *sacB*+ | Hoang et al., 1998 |
| pEX18Tc-△*putA*::Gm | *putA* gene of PAK deletion on pEX18Tc; Gmr, Tcr | This study |
| pEX18Tc-△*pruR*::Gm | *pruR* gene of PAK deletion on pEX18Tc; Gmr, Tcr | This study |
| pUC18T-mini­-Tn7T-Gm | For gene insertion in chromosome; Gmr | Choi and Schweizer, 2006 |
| pUC18T-mini­-Tn7T-Gm-*putA* | pUC18T-mini­-Tn7T-Gm with *putA* gene driven by its native promoter for chromosomal insertion; Gmr | This study |
| pUC18T-mini-Tn7T-Gm-*pruR* | pUC18T-mini­-Tn7T-Gm with *pruR* gene driven by its native promoter for chromosomal insertion; Gmr | This study |
| pTNS3 | Helper plasmid; Ampr | Choi and Schweizer, 2006 |
| pET-28a(+) | Clone vector; Kanr | Novagen |
| pPruR | pET-28a(+) harboring *pruR* gene; Kanr | This study |
| pACYC184*lacZ* | pACYC184 harboring promoterless *lacZ* gene; Camr | This study |
| pACYC184*putA-lacZ* | pACYC184*lacZ* harboring *putA* promoter -*lacZ* fusion;Camr | This study |
| pDN19*lacZ*Ω | Promoterless *lacZ* fusion vector; Spr, Smr, Tcr | Weng et al., 2016 |
| pDN19*putA-lacZ*Ω | pDN19*lacZ*Ω harboring *putA* promoter-*lacZ* fusion; Spr, Smr, Tcr | This study |
| pUCP20 | Clone vector; Cbr | Choi and Schweizer, 2006 |
| pUCP20-*putA* | pUCP20 harboring *putA* gene; Cbr | This study |

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